

## STUDIES IN RHYNCHOPHORA, VI. "THE NEW YORK WEEVIL."

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*Ithycerus novboracensis* was termed the New York weevil by Riley. It is the only species of its genus, and at the same time the only species known of a very distinct subfamily. It is therefore of much interest and importance, and my object in writing this brief paper is to make known its extremely peculiar sex characters and to point out that by these, as well as by some of the body-characters, it is allied to the Australian Belidæ. This affinity is exhibited more strongly by the male than it is by the female. Such of the female Belidæ as I have examined possess a well-developed ovipositor, while this structure is absent in *Ithycerus*, the vaginal plates and palps being attached to the margin of the membranous vulva. Hence I believe it will be best to treat *Ithycerus* at present as an isolated subfamily of Belidæ. This family is largely represented in Australia by quite a variety of remarkable forms, very few of which have been well investigated, hence it is not improbable that the subfamily Ithycerides may later on not be found to be so distinct from other Belidæ as appears at present to be the case.

Two or three species of Belidæ are known from South America; I have not been able to obtain specimens of them for study as they are at present very rare in collections, but judging from superficial inspection it would seem that they have very little relation to *Ithycerus*. No Belid occurs in Central America, and in fact none but *Ithycerus* occurs in the whole of the northern hemisphere: there are a few representatives of the family in New Guinea and New Zealand.

The body characters of *Ithycerus*, though agreeing in important characters rather strongly with Belidæ, depart in certain particulars, the most important of which are the definite club of the antennæ, and the thicker rostrum with much larger mouth-parts.

The genitalia of the Belidæ are at present known only by the figure and brief description of the male parts given by F. Muir and

myself (Trans. Ent. Soc. London, 1912, p. 571, pl. LXXVI, f. 223) where the sac is not extended, and consequently is only imperfectly shown; those of *Ithyecerus* I believe are quite unknown, and I give below the best sketch I can manage from the material at my disposal, and for which I am much indebted to Mr. C. W. Leng. The illustrations accompanying are due to Mr. and Mrs. F. Muir.

*The male characters.*—On superficial inspection of the abdomen six segmental plates are visible ventrally, that is one more than is usual in Rhynchophora. On dissection, however, it is seen that the apical one is really a part of the dorsum. This has already been explained by Dr. G. H. Horn, and will readily be understood by looking at our Fig. 1. In *Belus* the arrangement is similar except that the last segment is withdrawn into the penultimate one. Extraordinary as is the last dorsal plate the corresponding ventral (Fig. 2, VIII) is even more remarkable. It is reduced to an undivided, sinuous, half-ring, very hard, and prolonged in the middle in the anterior direction as a short strut, above which reposes the fork of the speculum which is like a Y with a very long stalk, and on this fork there is a fold of membrane, having on each side a slender streak of chitin (*x* in Fig. 4); just beyond and between the fork and the rods is the distal extremity of the genital tube—the genital orifice. Owing to this disposition of the parts of the last segment, the anal and genital orifices are placed in a cleft anterior to the termination of the body instead of at its extremity as usual (Fig. 3).

The ædeagus (Figs. 6 and 7) is very remarkable; the delicate membrane that forms the apical part of the genital tube is of unusual elongation, and permits the ædeagus to be withdrawn far into the body, the tip of the median lobe (the so-called "penis") being then 2.5 millimeters away from the spot where it finds exit. This membrane being severed and removed, the ædeagus can be taken out and then, in its contracted form, presents the appearance shown in Fig. 6, the outer part being the tegmen (*t f. 6*) through which the median lobe plays (*ml*): this tegmen is of peculiar form; the bridge (dorsal part, or cap-piece) consisting of two chitinizations connected into one piece by strong membrane, but each projecting distally as a long, free, illiate lobe, with a U-like space between them; the strut (*ts*) ventrally placed is long and nearly straight and the sides forming its fork are large and continued dorsally as the lobed plates of the cap

just described. The tegmen can be easily dissected off and then the median lobe (*ml*) and its sac (*is*) can be seen; this lobe ("penis") is tongue-like in form; its dorsal aspect is of tough, transparent membrane, with a stronger, chitinized yellow strip along the middle: the lower aspect is membranous basally, but the sides and tip are hard and dark; the struts (*ms*) are long, flat plates, a little longer than the body of the lobe, and where they join the body a strong chitinous band passes all across the dorsal aspect and from it departs the median dorsal strip described above, and it is also continuous with the strong margin of the lowest aspect.

The sac (*is*) is highly peculiar; it is shown in contraction in Fig. 6, and extended (but not completely) in Fig. 7, where it is seen to be an elongate membranous tube, rendered irregular by projecting lobes, and bearing apically a long slender flagellum (*f*) at the termination of which is the functional orifice; in Fig. 7 this termination cannot be seen as it is twisted under the sac, but it is shown in Fig. 6. This flagellum is however probably not really the termination of the organ, for there is nearly certainly within it another very delicate and protrusible flagellum that bears the true functional orifice.

*The female genital structures.*—The abdomen has seven visible dorsal plates, six of which are membranous, the seventh, or apparently terminal one, being chitinized and black, grooved along the middle. Ventrally only 5 segments are apparent, but on taking off the abdomen two others can be distinguished in close apposition with the metasternum and coxæ. The five visible plates are subequal in length, the sutures (or rather lines of separation) are slight, and have very little mobility, so that curving of the abdomen is impracticable. On taking off the abdomen, and examining the apex an eighth abdominal segment is disclosed. The eighth dorsal is rather long and hard, and its base is connected by membrane with an eighth ventral, which is shovel-like in shape, and has a slender handle or strut about as long as itself. This eighth ventral is connected with the seventh by a very ample membrane which is folded forwards; along the middle of the shovel there is a membranous space that anteriorly does not extend so far as the beginning of the strut. From within the eighth segment there protrudes the termination of the genital tube in the form of a pair of large corneous plates or vaginal palps,

each of which is a two-segmented structure, of which the basal part is a hard, narrow, long plate, ciliate at the margin and bearing a minute, terminal, freely-articulated segment.

The alimentary canal terminates just above the base of these vaginal plates, so that just above the anus is the termination of the genital tube, there being nothing between the two orifices but a little membrane. The genital orifice is membranous, ample, and proceeding forwards very soon divides into two branches, one of which is soon strongly elbowed, and then narrows to form a spiral duct that bears the spermatheca; this is of very remarkable and unusual form, a bent, long tube, with a round head; the duct enters close to the head, and at the same place there is connection with a rather long, tubular gland.

EXPLANATION OF PLATE X.

(*All of the male.*)

FIG. 1. Profile of abdomen.

FIG. 2. Ventral aspect of last segment.

FIG. 3. Connection of dorsal and ventral plates of last segment (diagrammatic).

FIG. 4. Terminal portion of genital tube.

FIG. 5. Last ventral plate, spiculum and terminal portion of genital tube.

FIG. 6. Ædeagus as extracted, in contracted state.

FIG. 7. Internal sac; approximation to its functional condition of extension: dorsal aspect.

The lettering is uniform throughout, viz.: Numerals, 1-8, dorsal sclerites of abdomen; I-VIII, ventral sclerites.

Letters, *a*, strut of last ventral; *b*, anus; *cm* 1, first connecting membrane; *ej*, duct from the testes; *f*, fork of speculum; *fl*, flagellum; *is*, sac; *ml*, median lobe; *ms*, median lobe struts; *s*, spiracle; *sp*, spiculum; *t*, tegmen; *ts*, strut of tegmen; *x*, chitin rod at termination of genital tube.

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NEW NORTH AMERICAN SPECIES OF APION.

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Specimens of an *Apion* bred from galls on *Hibiscus moscheutos* at Arlington, N. J., have recently been sent me for identification by Mr. H. B. Weiss. An examination shows that they can not be re-